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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/923,341	08/08/2001	Gillian F. Marshall	124-880	2769

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NIXON & VANDERHYE P.C.
8th Floor
1100 North Glebe Road
Arlington, VA 22201-4714

EXAMINER

NGUYEN, JOSEPH H

ART UNIT PAPER NUMBER

2815

DATE MAILED: 08/02/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/923,341

Applicant(s)

MARSHALL ET AL.

Examiner

Joseph Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on _____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) 15-37 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4,5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Election/Restrictions

Applicant's election of claims 1-14 in Paper No. 7 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)). Therefore, claims 1-14 are prosecuted whereas claims 15-37 are withdrawn from consideration.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

Claims 1 and 7 are rejected under 35 U.S.C. 102(e) as being anticipated by Sahara et al or Lee et al.

With respect to Sahara et al

Regarding claim 1, Sahara et al discloses on figure 13B a photo-detector circuit including a photodiode and an associated readout circuit (col. 23, lines 47-48), characterized in that the circuit incorporates a CMOS component, at least one epitaxial

layer 164 which is an active region of the photodiode detector and a guard ring 165 delimiting the photo-detector to enhance electric field uniformity and inhibit breakdown.

Regarding claim 7, Sahara et al discloses on figure 13B the photo-circuit is arranged to provide a logarithmic response to incident radiation.

With respect to Lee et al

Regarding claim 1, Lee et al discloses on figure 2 a photo-detector circuit including a photodiode and an associated readout circuit, characterized in that the circuit incorporates a CMOS component, at least one epitaxial layer which is an active region of the photodiode detector and a guard ring 16(N+) delimiting the photo-detector to enhance electric field uniformity and inhibit breakdown.

Regarding claim 7, Lee et al discloses on figure 13B the photo-circuit is arranged to provide a logarithmic response to incident radiation.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sahara et al or Lee et al as applied to claim 1 above, and further in view of Inoue et al.

Regarding claim 2, Sahara et al or Lee et al disclose substantially all the structure set forth in the claimed invention except a substrate insulated from CMOS circuitry. However, Inoue et al discloses on figure 2 a substrate 101 insulated from

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CMOS circuitry 117. In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sahara et al or Lee et al by having a substrate insulated from CMOS circuitry for the purpose of reducing the leakage current in a CMOS photodiode device.

Claims 3-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sahara et al or Lee et al and Inoue et al as applied to claim 2 above, and further in view of Cunningham et al.

Regarding claim 3, Sahara et al or Lee et al and Inoue et al disclose substantially all the structure set forth in the claimed invention except the photo-diode being a PIN structure. However, Cunningham et al discloses on figure 2 the photo-diode detector being a PIN structure 26. In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sahara et al or Lee et al and Inoue by having the photo-diode being a PIN structure for the purpose of improving the performance of a CMOS photo-diode device.

Regarding claims 4-6, Sahara et al or Lee et al and Inoue et al together disclose the structure set forth in claims 4-6.

Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sahara et al or Lee et al as applied to claim 1 above, and further in view of Okabayashi et al.

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Regarding claim 8, Sahara et al or Lee et al disclose substantially all the structure set forth in the claimed invention except parasitic photo-diodes arranged to contribute to circuit output in response to incident radiation. However, Okabayashi et al discloses on figure 10 parasitic photo-diodes arranged to contribute to circuit output in response to incident radiation. In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sahara et al or Lee et al by having parasitic photo-diodes arranged to contribute to circuit output in response to incident radiation for the purpose of increasing the signal to noise ratio as taught by Okabayashi et al (col. 2, lines 47-48).

Regarding claim 9, Sahara et al or Lee et al disclose substantially all the structure set forth in the claimed invention except amplifier arranged to provide feedback to stabilize photo-diode detector. However, Okabayashi et al discloses on figure 10 amplifier arranged to provide feedback to stabilize photo-diode detector. In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sahara et al or Lee et al by having amplifier arranged to provided feedback to stabilize photo-diode detector for the purpose of increasing the signal to noise ratio as taught by Okabayashi et al (col. 2, lines 47-48).

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sahara et al or Lee et al and Okabayashi et al as applied to claim 9 above, and further in view of Fossum et al.

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Regarding claim 10, Sahara et al or Lee et al and Okabayashi et al disclose substantially all the structure set forth in the claimed invention except a load transistor. However, Fossum et al discloses a load transistor. In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sahara et al or Lee et al and Okabayashi et al by having a load transistor for the purpose of improving the performance of a CMOS photo-diode device.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sahara et al or Lee et al and Okabayashi et al and Fossum et al as applied to claim 10 above, and further in view of Uchida et al.

Regarding claim 11, Sahara et al or Lee et al and Okabayashi et al and Fossum et al disclose substantially all the structure set forth in the claimed invention except the amplifier being a push pull amplifier. However, Uchida et al discloses a push pull amplifier (col. 2, line 41). In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sahara et al or Lee et al and Okabayashi et al and Fossum et al by having the amplifier being a push pull amplifier for the purpose of improving the performance of a CMOS photo-diode device.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sahara et al or Lee et al and Okabayashi et al and Fossum et al as applied to claim 10 above, and further in view of Kozlowski.

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Regarding claim 12, Sahara et al or Lee et al and Okabayashi et al and Fossum et al disclose substantially all the structure set forth in the claimed invention except a cascode transistor. However, Kozlowski discloses on figure 3 a cascode transistor Q28. In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sahara et al or Lee et al and Okabayashi et al and Fossum et al by having would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sahara et al or Lee et al and Okabayashi et al and Fossum et al by having a cascode transistor for the purpose of improving the performance of a CMOS photo-diode device.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sahara et al or Lee et al as applied to claim 1 above, and further in view of Inoue et al and further in view of Cunningham et al.

Regarding claim 13, Sahara et al or Lee et al disclose substantially all the structure set forth in the claimed invention except a substrate insulated from CMOS circuitry. However, Inoue et al discloses on figure 2 a substrate 101 insulated from CMOS circuitry 117. In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sahara et al or Lee et al by having a substrate insulated from CMOS circuitry for the purpose of reducing the leakage current in a CMOS photodiode device.

Sahara et al or Lee et al and Inoue et al disclose substantially all the structure set forth in the claimed invention except the photo-diode being a PIN structure. However,

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Cunningham et al discloses on figure 2 the photo-diode detector being a PIN structure 26. In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sahara et al or Lee et al and Inoue by having the photo-diode being a PIN structure for the purpose of improving the performance of a CMOS photo-diode device.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sahara et al or Lee et al and Inoue et al and Cunningham et al as applied to claim 31 above, and further in view of Morikawa et al.

Regarding claim 14, Sahara et al or Lee et al and Inoue et al and Cunningham et al disclose substantially all the structure set forth in the claimed invention except the undoped epitaxial layer being of SiGe alloy. However, Morikawa et al discloses on figure 3A the undoped epitaxial layer 14 being of SiGe. In view of such teaching, it would have been obvious to one of the ordinary skill in the art at the time the invention was made to modify Sahara et al or Lee et al and Inoue et al and Cunningham et al by having the undoped epitaxial layer being of SiGe alloy for the purpose of improving the performance of a CMOS photo-diode device.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US Patent 6005266 to Forrest et al discloses an image array.

Conclusion

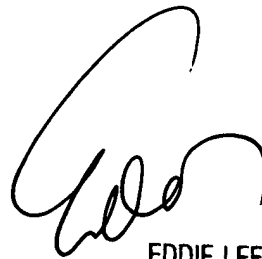
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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Nguyen whose telephone number is (703) 308-1269. The examiner can normally be reached on Monday-Friday, 7:30 am- 4:30 pm

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (703) 308-1690. The fax phone numbers for the organization where this application or proceeding is assigned is (703) 308-7382 for regular communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JN
July 26, 2002



EDDIE LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800